REMARKS

I. OVERVIEW

Applicants have reviewed and considered the Office Action mailed January 18, 2007 and the references cited therewith. The Applicants acknowledge withdrawal of claims 11-14 from consideration for being drawn to a non-elected invention. Claims 1-14 are pending in the present application. Claims 1, 4, 8-9 and 10 have been amended. No new matter has been added. The specification has been amended to capitalize all trademarks and correct obvious typographical errors. Replacement drawings are also submitted herewith in response to an objection. In light of the remarks that follow, Applicants respectfully request reconsideration and withdrawal of the rejections.

II. OATH/DECLARATION

The oath stands objected to as being defective by the Examiner.

The current application is a continuation of a previously filed application and thus a newly executed declaration is not required. 37 CFR 1.63(d)(1). Submitted herewith is a copy of the declaration filed in the prior application, showing the signature, for the continuation application. Applicants respectfully request that this objection be withdrawn.

III. SPECIFICATION

A. The Examiner states the specification is objected to because there are sequences on page 39, in lines 17 and 18 that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 C.F.R. § 1.821(a)(1) and (a)(2) and fails to comply with the requirements of 37 C.F.R. § 1.821 through 1.825.

Accordingly, Applicants have amended the specification at page 39 to include the appropriate sequence identifiers. Applicants have submitted a paper copy of the sequence listing, an electronic copy of the sequence listing and statements under 37 CFR 1.821(f) and (g). No new matter has been added. Applicants request entry of the sequence listing. Applicants believe they are in compliance with 37 C.F.R. § 1.821 through 1.825. In light of the above, Applicants request that this objection be withdrawn.

B. The Examiner states that the specification is objected to because the drawings are not referred to properly. If the drawings show Figures 7A and 7B; or Figures 10A and 10B, then the Brief Description of the Drawings should recite "Figures 7A-7B", instead of "Figure 7" and "Figures 10A-10B", instead of "Figure 10". Correction is requested.

Applicants have adopted the Examiner's suggestions and have amended the Specification accordingly. Figure 7 has been amended to recite Figures 7A-7B, Figure 10 has been amended to recite Figures 10A-10B. In light of the above amendments, Applicants request that this objection be withdrawn.

C. The Examiner states that the use of the following trademarks have been noted in this application: TWEEN, ZYMED, AFFI-GEL, BIO-RAD, and LAB-TEK. The Examiner continues, they should be written in all capital letters wherever they appear and be accompanied by the generic terminology.

Applicants thank the Examiner for pointing out this inadvertent error and accordingly have adopted the Examiner's suggestions so that the trademarks are capitalized throughout the application and generic terminology can be found adjacent to each trademark. Applicants submit that every effort has been made to prevent the use of trademarks in any manner which might

adversely affect their validity as trademarks. In light of the above, Applicants respectfully request that the objection be withdrawn and reconsidered.

IV. INFORMATION DISCLOSURE STATEMENT

The Examiner states the information disclosure statement filed December 11, 2003 fails to comply with 37 C.F.R. § 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed.

It is respectfully submitted that the current application is a continuation and therefore, references contained within the information disclosure statement were previously cited in the preceding applications and therefore, under 37 C.F.R. § 1.98(d), copies of the cited foreign patent documents and non-patent literature publications are not required. In light of the above, Applicants respectfully request that the objection be withdrawn and reconsidered.

V. DRAWINGS

The Examiner has objected to the drawings because Figures 2 and 5 appear on the same page, with Figures 3 and 4 following; therefore the figures are not in proper order.

Applicants thank the Examiner for pointing out these inadvertent discrepancies and accordingly have amended the Figures 2 and 5 so that they appear on individual pages and the drawings now appear in numerical order. Applicants believe that the submitted Figures are in compliance with 37 CFR 1.121(d).

VI. CLAIM OBJECTIONS

The Examiner states claim 1 is objected to because of the following informalities: Claim 1 recites "transforming a plant with a nucleotide construct expressing a recombinant viral immunogen in a plant". The Examiner continues that replacing "expressing" with --that expresses-- will obviate this objection.

Applicants thank the Examiner for this suggestion. Applicants have amended claim 1 to recite "transforming a plant with a nucleotide construct that expresses a recombinant viral immunogen in a plant" rather than "transforming a plant with a nucleotide construct expressing a recombinant viral immunogen in a plant ". In light of the above, Applicants respectfully request that the objection be withdrawn and reconsidered.

VII. CLAIM REJECTIONS UNDER 35 U.S.C. § 112

The Examiner states claims 1-10 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner continues, claims 1, 8 and 9 recite "a nucleotide construct", and it is unclear how a single nucleotide can comprise a construct. Replacing "nucleotide" with --nucleic acid-- will obviate this rejection.

Applicants thank the Examiner for this suggestion. Accordingly, Applicants have amended claims 1, 8 and 9 to recite, "nucleic acid construct" rather than "nucleotide construct". In light of the above, Applicants respectfully request that the rejection be withdrawn and reconsidered.

VIII. CLAIM REJECTIONS UNDER 35 U.S.C. § 103

A. Claims 1-5 and 7-10 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Goodman et al (U.S. Patent No. 4,956,282, issued September 11, 1990) in view of Kapikian et al. (Reviews of Infectious Diseases (1989) Vol. 11, supplement 3, pp. S539-S546).

Applicants respectfully traverse this rejection. Applicants respectfully submit that the Office Action did not make out a *prima facie* case of obviousness as neither the Goodman reference nor the Kapikian reference, alone or combined, teach each and every element of the claims and therefore cannot render the present invention obvious. M.P.E.P. § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)).

Applicants' independent claim 1 recites "selecting those plants expressing said recombinant viral immunogen at a level such that upon oral administration ... an immunogenic response to said viral immunogen is elicited". Independent claims 8 and 9 recite similar limitations.

The Examiner cites Goodman for teaching the expression of an immunogenic protein in a plant. (emphasis added). Office Action, at page 9. It is noted that the Examiner seems to be taking a very broad view of the disclosure in Goodman, broader than the actual disclosure or that supported in the decision by the Board of Patent Appeals and Interferences (BPAI)) (*Ex parte* Roy Curtiss III and Guy A. Cardineau, Appeal No. 93-4341, Heard January 11, 1996). Submitted herewith for the Examiner's consideration.

Applicants contend that Goodman describes using a transgenic plant to expresses interferon gamma. Goodman. '282, Col. 5- Col.10. These proteins are then administered to animals for their inherent biological functions, not their immunogenic properties. Applicant's view about the Goodman reference is bolstered by a decision by the BPAI (*Ex parte* Roy Curtiss III and Guy A. Cardineau, Appeal No. 93-4341, Heard January 11, 1996). The Board explicitly stated that the Goodman reference does not teach a transgenic plant that expresses an antigenic protein, and said protein induces an immune response in animals. It is apparent that the Board viewed the Goodman reference as teaching a transgenic plant to function as mini-factory for the production of mammalian proteins, the function of which does not extend to the area of eliciting immune responses in animals. The Board held:

> Where the product can have a physiological effect on ingestion, Goodman discloses, it may be sufficient that the product be retained within the plant. This will be true where the plant part is edible. See Goodman, paragraph bridging pages 9 and 10. However, Goodman does not disclose or suggest retaining in the plant a protein which has no effect on ingestion. Like all of the references discussed above, **Goodman does not disclose or suggest a transgenic plant which (a) expresses a DNA sequence coding for a colonization antigen or antigenic determinant thereof, or Streptococcus mutants of Escherichia coli, and (b) induces a secretory immune response.** (emphasis added)

Kapikian fails to supply the teachings that are lacking in Goodman. Clearly, the combination of references fails to teach or suggest the limitations of the claims and thus cannot render the claimed invention obvious.

Applicants respectfully submit that the Office Action did not make out a *prima facie* case of obviousness because the fact that references can be combined or modified is not sufficient. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. *In re Vaeck*, 947 F.2d

488, 20 USPQ2d 1438 (Fed. Cir. 1991); MPEP § 2143. The Examiner must avoid hindsight. *In re Bond*, 910 F.2d 831, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990).

The Examiner cites the motivation for combining these two references as "the success of producing recombinant therapeutic proteins in plants taught by Goodman and the success of utilizing recombinant proteins for vaccines as taught by Kapikian". Office Action, at page 10.

Applicants disagree. Goodman teaches the expression of a dental bacterial antigen, not a viral mammalian protein that that relies solely on plant machinery for proper expression and folding. Moreover, the viral immunogen would normally only be expected to express in a mammal due to viral tropism. Applicants' point out that claimed invention of expressing a viral mammalian protein in a plant is pioneering work from nearly fifteen ago and therefore is deserving of broad patent protection. Furthermore, as discussed above, Goodman contemplates the use of a transgenic plant to produce a protein that, contrary the Examiner's statement, is not immunogenic. Therefore, the production of such proteins does not constitute a vaccine.

Next, the Examiner cites Kapikian for the proposition of "the success of utilizing recombinant proteins for vaccines as taught by Kapikian". Applicants submit that when the Kapikian reference is read as a whole, the reference teaches the state of the art concerning possible human rotavirus vaccines, specifically vaccines of attenuated, whole rotaviruses from animals, not plants and not directed to individual recombinant, viral immunogenic proteins. Thus, one of ordinary skill in the art would not have made the combination of Goodman and Kapikian to arrive at the present invention. One skilled in the art at the time of the invention would have seen no relevance of the Goodman patent to the Kapikian article and would not have modified methods based on these references. Therefore, the claimed invention is patentable and

not obvious. Therefore, the claims are not obvious. In light of the foregoing, Applicant requests that the rejection to claims 1-5 and 7-10 under 35 U.S.C. §103 be withdrawn and reconsidered.

B. Claim 6 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Goodman et al. (U.S. Patent No. 4,956,282 issued September 11, 1990) in view of Kapikian et al. (Reviews of Infectious Diseases (1989) Vol. 11, supplement 3, pp. S539-S546), as applied to claims 1-5 and 7-10 above, and further in view of Kay et al. (Science (1987), Vol. 236, pp. 1299-1302), and further in view of Gallie et al. (MGG (1991), Vol. 228, pp. 258-264).

Applicants respectfully traverse this rejection. Applicants respectfully submit that the Office Action did not make out a *prima facie* case of obviousness as neither the Goodman, Kapikian, Kay or Gallie references, alone or combined, teach each and every element of claim 6 and therefore cannot render the claim obvious. M.P.E.P. § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

Applicants' claim 6 depends from independent claim 1 which recites, "selecting those plants expressing said recombinant viral immunogen at a level such that upon oral administration ... an immunogenic response to said viral immunogen is elicited".

As discussed above, the Goodman reference does not teach a method of producing a recombinant viral immunogen in a plant as found in the Applicants' claim 1. Kapikian, Kay and Gallie fail to supply the teachings that are lacking in Goodman. Clearly, the combination of references fail to teach or suggest the limitations of claim 1 and thus cannot render claim 1 obvious.

Thus, the prior art references, alone or combined, fail to teach or suggest all the claim limitations of the present invention. Therefore, claim 1 is not obvious. Claim 6 dependent on

independent claim 1 is likewise not obvious for the reasons argued above, plus the elements in the claim. In light of the foregoing, Applicant requests that the rejection to claim 6 under 35 U.S.C. §103 be withdrawn and reconsidered.

IX. DOUBLE PATENTING

A. Claims 1-10 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 5-6 and 9-14 of U.S. Patent No. 5,484,719 issued January 16, 1996.

A terminal disclaimer is enclosed herewith to obviate the double patenting rejection. Applicants respectfully request that this rejection be withdrawn.

B. Claims 1-10 are rejected on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 2-14 of U.S. Patent No. 5,612,487 issued March 18, 1997.

A terminal disclaimer is enclosed herewith to obviate the double patenting rejection. Applicants respectfully request that this rejection be withdrawn.

C. Claims 1-10 stand rejected on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claim 14 of U.S. Patent No. 5,792,935 issued August 11, 1998. The Examiner states that because a species anticipates a genus, claim 14 of U.S. patent no. 5,792,935 anticipates claims 1 and 3 of the present application.

Applicants respectfully traverse these grounds for rejection. Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *In re Dillon* 919 F.2d 688, 16 USPQ 2d 1897, 1908 (Fed. Cir. 1990) (en banc), cert. denied, 500 U.S.

904 (1991). Applicants respectfully submit that the reference does not teach the identical invention in as complete detail as is contained the claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); *See* MPEP § 2131. Therefore, Applicants respectfully submit that claim 14 of U.S. patent no. 5,792,935, herein after the '935 patent, does not anticipate claims 1 and 3 of the present application.

Claim 1 is directed to a method of producing an immunogenic composition that involves, in part, selecting a plant transformed with a nucleic acid construct that expresses a recombinant viral immunogen in a plant, and expressing the recombinant viral immunogen at a level that elicits an immunogenic response to the viral immunogen upon oral administration of a composition including the viral immunogen. Because the '935 patent does not teach expressing the recombinant viral immunogen in a plant at a level such that upon oral administration of a composition comprising the viral immunogen an immunogenic response to the viral immunogen is elicited, the '935 patent does not teach all the limitations of claim 1. Therefore, the '935 patent cannot anticipate claim 1 or claim 3, dependent from claim 1.

Applicants respectfully submit that claim 14 of the '935 patent does not make obvious claims 2 and 4-10 of the present invention. "To render a later invention unpatentable for obviousness, the prior art must enable a person of ordinary skill in the field to make and use the later invention." *In re Kumar*, 418 F.3d 1361, 1369 (Fed. Cir. 2005). Applicants respectfully submit that the '935 patent, while presumed enabling for transforming a Musa plant, does not enable a person of ordinary skill in the art to make and use Applicants' invention.

First, the '935 patent does not provide any data indicating that the hepatitis B surface antigen expressed in banana plants, much less provide any levels of hepatitis B surface antigen

expression or suggest that the expression levels achieved would be successful in eliciting an immune response. Therefore, there is no expectation of success that expression of hepatitis B surface antigen in bananas, much less the genus of plants, would elicit upon oral administration an immunogenic response. Thus, the '935 patent does not teach one of ordinary skill in the art the claimed methods.

Furthermore, the '935 patent does not provide any guidance to one skilled in the art as to what factors to take into consideration when expressing a viral immunogen in a plant, for example, how to select a host plant for expressing a viral immunogen, such as, whether to express the immunogen in an edible or non-edible tissue of the plant, whether the tissue of the host plant requires heating prior to consumption, how to transfer genes into both monocot and dicot plants, and how to express the foreign protein in the desired part(s) of the plant, for example, what suitable promoters may be used. This is in direct contrast to the teaching and guidance provided in Applicants' disclosure.

Without undue research and experimentation, one skilled in the art would be unable to produce from the '935 patent, the methods of claims 1-10. Accordingly, the '935 patent does not enable one of ordinary skill in the art to make or use the invention of claims 1-10. For at least these reasons, the '935 patent does not anticipate or make obvious claims 1-10. In light of the above, Applicants respectfully request that this rejection be withdrawn and reconsidered.

D. Claims 1-10 stand rejected on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 8-11 of U.S. Patent No. 6,034,298 issued March 7, 2000.

A terminal disclaimer is enclosed herewith to obviate the double patenting rejection. Applicants respectfully request that this rejection be withdrawn.

X. CONCLUSION

This is a request under the provision of 37 CFR § 1.136(a) to extend the period for filing a response in the above-identified application for two months from April 18, 2007 to June 18, 2007. Applicant is a small entity; therefore, please charge Deposit Account number 26-0084 in the amount of $225.00 to cover the cost of the one month extension. Any deficiency or overpayment should be charged or credited to Deposit Account 26-0084.

Respectfully submitted,

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